

Unsteady magnetohydrodynamic oscillatory flow of viscoelastic fluids in a porous channel with heat and mass

Abstract

In this paper, we analyze the effects of slip condition on the **unsteady magnetohydrodynamic (MHD) flow of incompressible viscoelastic fluids in a porous channel** under the influence of transverse magnetic field and Hall current **with heat and mass** transfer. The **channel flow** is induced due to external pressure gradient of **oscillatory** form. The governing equations for the velocity field, temperature and concentration distributions, are solved using perturbation technique. We present the results for skin friction, Nusselt number and Sherwood number. The numerical results are also computed for skin friction in tabular form. The effects of various indispensable **flow** parameters are displayed using several graphs. The numerical results show the effects of the physical parameters on the **fluid flow** as well as on **heat and mass** transfer and skin friction. The solutions for Newtonian **fluids** can be obtained as a limiting case from our general solutions when the **viscoelastic** parameter is zero. © 2012 The Physical Society of Japan.